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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,792	03/03/2004	Sang-cheol Ko	102-1019	4382

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WASHINGTON, DC 20006

EXAMINER

ELVE, MARIA ALEXANDRA

ART UNIT	PAPER NUMBER
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1725

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No. 10/790,792	Applicant(s) KO ET AL.	
	Examiner M. Alexandra Elve	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4 and 6-27 is/are pending in the application.
- 4a) Of the above claim(s) 23-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4 and 6-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Newly submitted claims 23-27 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: new claims are directed towards etching a first surface that is different than the heating unit location and the separation of a plurality of ink jet heads.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 23-27 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

Claims 7 & 15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, that is, "cleaning an organic material having flown in the wafer".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4, 6-7, 9 & 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richerzhagen (USPN 5,902,499) in view of Yamamoto et al. (USPN 5,482,660), Merdan et al. (USPN 6,696,666) and Peng et al. (USPN 6,737,606).

Richerzhagen discloses a laser and liquid jet for material machining. The system has a processing module (housing) and the workpiece is cut using the laser-liquid jet device. Nd:YAG lasers may be used. Pressures range from about 10 bars to 1000 bars. Nozzles are sizes from 5 to 50um. A conical shape may be used for focusing.

Richerzhagen does not teach the presence of a wafer, or a stage or all types of lasers or the laser beam diameter.

Yamamoto et al. discloses the fabrication of an ink jet head. Side and top-down jets are taught. An excimer laser beam is irradiation on the discharge port face and the stage is moved with the substrate thereon. The substrate may be made of glass, quartz and ceramic.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a stage and a wafer, as taught by Yamamoto et al. in the Richerzhagen process because the stage enhance versatility during fabrication and the use of a wafer is merely a design choice.

Although the exact pressures and sizes are not taught they are closely approximating or overlapping. It is well settled that where patentability is predicated upon a change in a condition of prior art process, such as pressure or hole size, the change must be at least "critical", that is, it must lead to a new and unexpected result.

The applicant has the burden of providing such criticality. Note In re Aller et al. 105 USPQ 223.

Merdan et al. discloses the use of hybrid laser water jet system (laser micro-jet). Types of lasers suitable for use with this system are YAG lasers, IR lasers, CO2 lasers, diode lasers and any combination thereof. (col. 2, lines 28-39, 65-67; col. 5, lines 12-17, 30-36)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use different types of lasers as taught by Merdan et al. because this is drawn to the same liquid jet guided laser.

Peng et al. discloses the use of laser beam liquid assembly for the dicing of wafers. The liquid stream has a diameter equal to the laser beam diameter, which is about 50 to 150 μm . (col. 2, lines 19-23, 53, 60-62; col. 7, lines 22-27)

It would have been obvious to one of ordinary skill in the art at the time of the invention to note the diameter as taught by Peng et al. because these parameters are based on the same liquid jet guided laser.

Claims 8 & 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., as stated in the above paragraph and further in view of Hashimoto et al. (USPAP 2004/0246292).

Richerzhagen does not teach dicing of a wafer.

Hashimoto et al. discloses separation of a silicon wafer in the manufacturing of an ink jet head. It would have been obvious to one of ordinary skill in the art at the time of the invention to dice a wafer, as taught by Hashimoto et al. in the Richerzhagen system because it is merely a specific type of laser and liquid jet material machining.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.

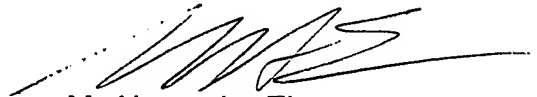
Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

January 9, 2007.

A handwritten signature in black ink, appearing to read 'MA Elve', with a long horizontal line extending to the right.

M. Alexandra Elve
Primary Examiner 1725